

## Florida Scrub-jay Survey Protocol

These guidelines are the minimum levels of effort the Service believes are necessary to determine the presence or absence of the Florida scrub-jay (*Aphelocoma coerulescens*) (scrub-jay) in an area. Suitable habitat on the property may not only be the nest sites of scrub-jays, but could be part of the scrub-jay foraging habitat, which is considered by the Service as occupied, because the habitat fulfills the species life history requirements. In most applications, a one time survey event within the preferred time-of-year sufficient for Service consultations.

These survey protocols are primarily adapted from Fitzpatrick et al. (1991). The most effective method of surveying a site for scrub-jays is to traverse the area systematically, using a high quality tape recording of scrub-jay territorial scolding in an attempt to attract the scrub-jays. The recording should include clear examples of all typical territorial scolds, including the female "hiccup" call. Vocalizations are available from:

Macaulay Library  
Cornell Lab of Ornithology  
159 Sapsucker Woods Road  
Ithaca, NY 14850  
Phone: (607) 254-2157  
Fax: (607) 254-2439  
Email: [macaulaylibrary@cornell.edu](mailto:macaulaylibrary@cornell.edu)  
Web site: [www.birds.cornell.edu/macaulaylibrary](http://www.birds.cornell.edu/macaulaylibrary)

Map habitat types for the project area and a 183-m (600 ft) buffer zone either on a 7.5-min U.S. Geological Survey (USGS) topographic map or an aerial photograph at a scale of no more than 1:4800 scale. The habitat map should also show all existing development. On the habitat map, establish parallel line transects across all suitable habitat. Habitats to sample should include not only the more "classic" xeric oak scrub, scrubby pine flatwoods, scrubby coastal strand, and sand pine scrub, but also improved, unimproved, and woodland pastures; citrus groves; rangeland; pine flatwoods; longleaf pine xeric oak; sand pine; sand pine plantations; forest regeneration areas; sand other than beaches; disturbed rural land in transition without positive indicators of intended activity; and disturbed burned areas. The presence of scrub oaks, no matter how sparsely distributed, is the key indicator of "scrub" habitat.

Along each transect establish playback stations. Distance between transects and stations depend on many factors, including power of the speaker used for broadcasting the calls, topography of the site, and the density of the surrounding vegetation. Adequate spacing between transects can be estimated roughly as the distance at which a person listening to the tape directly in front of the speaker perceives the "bird" to be no more than about 100 m (328 ft) away. A distance of 100 to 200 m (328-656 ft) between transects and stations is generally adequate when using a good-quality, hand-held cassette player broadcasting at full volume. Use 100 m (328 ft) for dense canopy scrub and 200 m (656 ft) for open scrub. Place transect and playback stations so that all scrub types will be sampled for scrub-jays.

Surveys should be carried out on calm, clear days about one hour after sunrise, and should terminate before midday. Surveys should not be conducted in winds stronger than a moderate breeze (5-8 mph), in mist or fog, or in precipitation exceeding a light, intermittent drizzle. Heat and especially wind lowers the tendency for scrub-jays to respond to distant territorial scolds, and wind reduces the distance over which recordings can be heard. Scrub-jays are also reluctant to fly on windy days regardless of hour or season.

Surveys should be conducted during the spring (March) or fall (September and October), when territorial displays are most frequent and vigorous. Other times of year are poor times to survey because scrub-jays are most likely to fly far for food or the young are quiet and the adults are occupied with molt and feeding fledglings. Consecutive surveys for a minimum of five days are sufficient to assess scrub-jay presence and territory size and distribution.

Transects may be driven or walked. If driven, step out or stand atop the vehicle at each playback station. Broadcast the calls at each station for at least one minute in all four directions around the playback station, emphasizing any direction in which low-growing oak scrub is the predominant vegetation. On the habitat map, plot the locations and indicate group size of all scrub-jays where they are first seen or heard. Note the direction from whence they came. Distinguish adult-plumaged scrub-jays from juvenile-plumaged scrub-jays whenever possible.

At localities with car trails, large areas of scrub can be surveyed with a vehicle in one day. On foot, the process is more laborious because of the relatively large size of territories. Once a group is located, stop broadcasting at that station. Remaining at this station briefly should result in the assembly of the entire group. This allows one to estimate group size and, if done during the midsummer, to distinguish young of the year from adults.

Sometimes two or more groups will be attracted to one station, usually from different directions. Observers should be careful, therefore, to plot each group where it was first spotted or heard. In rare circumstances, especially at sites where numerous groups congregate at artificial food or water sources, it may be difficult to differentiate groups. This is especially true where scrub-jays have become habituated and tame to human approach. Again, in such cases careful observation is extremely important. Studies of such congregations using color-marked scrub-jays have confirmed that almost always they consist of members of different family groups. Often they may have crossed several territory boundaries to reach the neutral feeding or drinking areas. The result gives a false impression of extremely high scrub-jay density.

It is essential that the subject area be surveyed to establish an accurate count of scrub-jay groups and territorial boundaries. If more than eight to ten scrub-jays are encountered at a single playback station during a fall or spring survey period, the scrub-jays at this site should be monitored carefully over several visits and different times of day. Numbers will shift as groups arrive and depart. Often it is possible to watch where the scrub-jays come from or return to as a means of determining how many groups are represented.

## Territory Boundary Determinations

In general, scrub-jays have well-defined territories defended year-round by all group members. Territorial defense is most active immediately before nesting in the spring and after molt is complete in autumn. Territorial boundaries may be most accurately predicted through a combination of observing scrub-jays and listening for territorial behavior (in the case where several families of scrub-jays exist in contiguous habitats) or by including habitat suitable for occupation by scrub-jays within a territorial boundary (in the case where a family of scrub-jays is somewhat isolated from other groups). Territories typically occupy the same areas for many years, and ownership is passed on by mate replacement or inheritance by helpers. Mean territory size is about 9 ha (25 acres), although the size may vary depending on group size and suitability of habitat. To determine the territorial boundaries of the scrub-jay group, it is essential that the surveyor be familiar with different types of behavior exhibited by scrub-jays.

The boundaries of scrub-jay groups can be determined by standard methods (Bibby et al. 2000). Here is a brief synopsis of the procedure. At each station, record the direction the scrub-jays came from and any observed hostility to other scrub-jays that also approach the station, especially if from a different direction. Also note the number of scrub-jays that approach the station as a group.

These responses are mapped on the habitat vegetation map and are the basis for determining occupied territories. A schematic is provided below that gives an example of scrub-jay survey responses and territory boundary determinations (Fig. 1). The survey grids are shown with the point counts for scrub-jays at each station, with direction of flight.

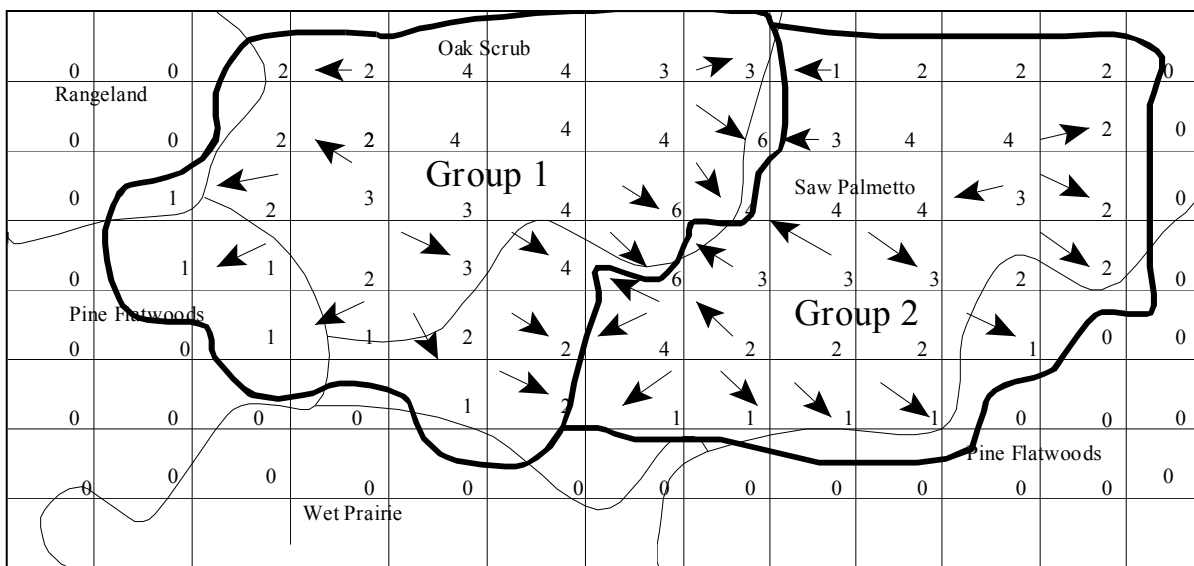


Figure 1. Schematic on determining territorial boundaries. Arrows indicate flight direction.

Territorial boundaries between adjacent groups are based on connecting station locations where territorial defense displays between scrub-jays were first observed. Fringe boundaries are determined as the midpoint between the last location that attracted scrub-jays and adjacent no-response locations. The boundaries are determined by connecting midpoints (Fig. 1). Where birds are attracted from different directions, the boundary between groups will be determined by connecting the stations with mixed groups.

The key end products of this procedure are a complete count of all on-site scrub-jay groups and an approximate territory map for each group.

A survey report to the Service should include the following, as applicable:

1. Brief description of the project.
2. An aerial photograph or habitat map depicting:
  - A. the project area and buffer zone;
  - B. habitat types;
  - C. transect lines and playback stations; and
  - D. territory boundaries of all scrub-jay groups.
3. Field data sheets including:
  - A. dates and starting and ending times of all surveys conducted;
  - B. weather conditions during all surveys, including average temperature, wind speed and direction, visibility, and precipitation; and
  - C. total number of scrub-jay groups found, number of scrub-jays in each group, and number of juvenile-plumaged scrub-jays in each of these groups.

## Literature Cited

- Bibby, C.J., N.D. Burgess, D.A. Hill, and S.H. Mustoe. 2000. Bird Census Techniques. 2<sup>nd</sup> Edition. Academic Press, London, United Kingdom.
- Fitzpatrick, J.W., G.E. Woolfenden, and M.T. Kopeny. 1991. Ecology and development-related habitat requirements of the Florida scrub-jay (*Aphelocoma coerulescens*). Florida Game and Fresh Water Fish Commission, Nongame Wildlife Program Technical Report No. 8. Tallahassee, Florida.